

ANSI/AISC 303-22
An American National Standard

Code of Standard Practice for Steel Buildings and Bridges

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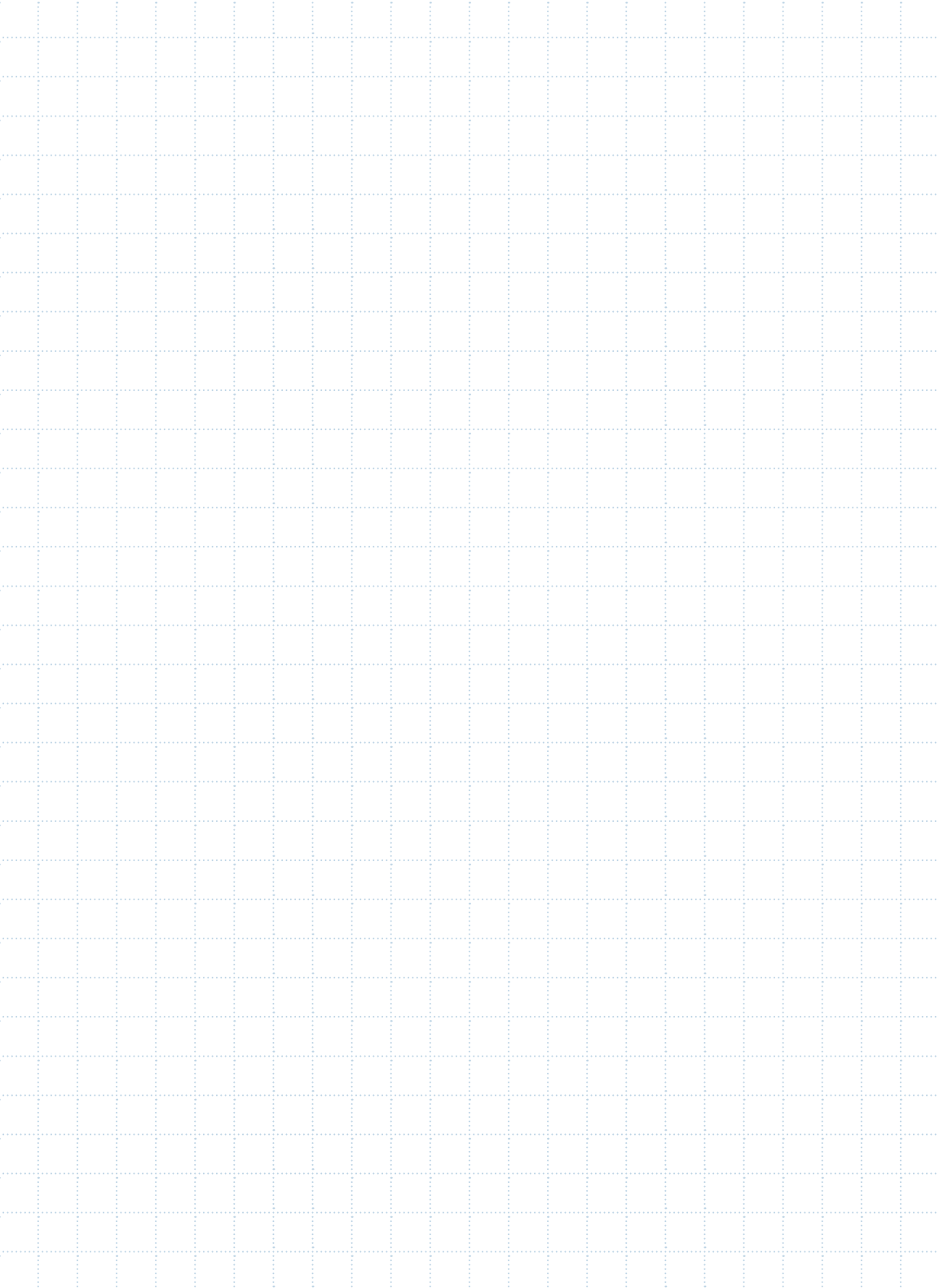
May 9, 2022

Supersedes the *Code of Standard Practice for Steel Buildings and Bridges*, dated June 15, 2016, and all previous versions

Approved by the Committee on the Code of Standard Practice



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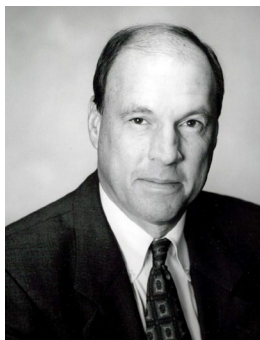
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The information presented in this publication has been prepared by a balanced committee following American National Standards Institute (ANSI) consensus procedures and recognized principles of design, construction, and contract interpretation. This document is intended as a statement of custom and usage in structural steel construction. Competent design, construction, and legal advice should be sought when applying the provisions of this document to a specific construction project or contract document. The publication of this information is not a representation or warranty on the part of the American Institute of Steel Construction, its officers, agents, employees, or committee members, or of any other person named herein. All representations or warranties, express or implied, other than as stated above, are specifically disclaimed. Anyone making use of the information presented in this publication assumes all liability arising from such use.

Caution must be exercised when relying upon standards and guidelines developed by other bodies and incorporated by reference herein, since such material may be modified or amended from time to time subsequent to the publication of this edition. The American Institute of Steel Construction bears no responsibility for such material other than to refer to it and incorporate it by reference at the time of the initial publication of this edition.

Printed in the United States of America

DEDICATION



Frank Wylie



James Stori

This edition of the AISC *Code of Standard Practice for Steel Buildings and Bridges* (the Code) is dedicated to two former Chairs of the Committee on the Code of Standard Practice who led us in succession to the sound, consensus Code platform we enjoy today: Frank Wylie and James Stori. Their pivotal influences as Committee Chairs combined for nearly 20 years of progress, which began in the mid-1990s.

Frank became the first Chair of a newly constituted and fundamentally different Committee that had a balance of representation across all major interests in design, contracting, and steel construction. With methodical precision, he managed a list of ideas and improvements so large and significant in impact that it spanned his tenure of two successive updates and continued into Jim's tenure as the next Chair. Frank could help the group out of even the deepest divide with his trademark transition: "Okay, ... here's what we're going to do." Everyone knew it was time then to focus on what's in common among our views and craft a successful outcome from that. And so we did!

Jim built upon that with his own savvy ability to see who in each discussion could best create the starting point through which the group would find a workable path forward. He led a number of next-generation improvements that made the earlier successes all the more valuable to the design community and construction industry. As they developed, he would skillfully bring the group along by summarizing: "Here's what we agree on," following with the next-closest opportunity to find agreement. And so we did!

A wonderful virtue Frank and Jim share is their thoughtful, respectful leadership style. They both ensured the opinions of all Committee members and all perspectives were heard, even when they personally disagreed. This made both of them incredibly successful at building consensus.

Their Committees did amazing work because they are capable leaders with clear vision. We celebrate Frank and Jim for their contributions and all they mean. They built the foundation upon which this edition and future ones are built.

PREFACE

(This Preface is not part of ANSI/AISC 303-22 but is included for informational purposes only.)

As in any industry, trade practices have developed among those that are involved in the design, purchase, fabrication, and erection of structural steel. The *Code of Standard Practice for Steel Buildings and Bridges* (ANSI/AISC 303-22), hereafter referred to as the Code, provides a useful framework for a common understanding of the acceptable standards when contracting for structural steel. As such, it is useful for owners, architects, engineers, general contractors, construction managers, fabricators, steel detailers, erectors, and others associated with construction in structural steel. Unless specific provisions to the contrary are contained in the contract documents, the existing trade practices contained herein are considered to be the standard custom and usage of the industry and are thereby incorporated into the relationships between the parties to a contract.

It is important to note the differences in design requirements between buildings and bridges. AISC 360 and AISC 341 establish the design requirements for buildings and building-like structures, and this Code sets complementary commercial and technical requirements. For highway bridges, the governing design requirements are established by AASHTO and implemented by the contracting agency; the commercial provisions of the Code are applicable, but technical provisions, such as tolerances, are not addressed. For railroad bridges, the governing design requirements are established by AREMA and implemented by the contracting agency; the commercial provisions of the code are applicable, but technical provisions, such as tolerances are not addressed.

The Glossary and Abbreviations are an integral part of this Code. In many sections of this Code, a nonmandatory Commentary has been prepared to provide background and further explanation for the corresponding Code provisions. The user is encouraged to consult it.

This Code is written—and intended to be utilized in practice—as a unified document. Contract documents may supersede individual provisions of the Code as provided in Section 1.1, except when doing so would violate a requirement of the applicable building code.

Since the first edition of this Code was published in 1924, AISC has continuously surveyed the structural steel design community and construction industry to determine standard trade practices. Since then, this Code has been periodically updated to reflect new and changing technology and industry practices.

The 2000 edition was the fifth complete revision of this Code since it was first published. Like the 2005, 2010, and 2016 editions, the 2022 edition is not a complete revision but does add important changes and updates. It is the result of the deliberations of a fair and balanced Committee, the membership of which included structural engineers, architects, a code official, general contractors, fabricators, a steel detailer, erectors, and inspectors. The following changes have been made in this revision:

- New terms are added to the Glossary that are tied to new provisions regarding specific instructions to the contrary in Section 1.1, and other new concepts summarized herein.
- A new Abbreviations sections is added to compile all relevant organization names and commonly abbreviated terms.

- Section 1.1 provisions were revised to strengthen the Code and provide clear requirements when specific instructions to the contrary are included in contract documents.
- Commentary to Section 1.1 was expanded and clarified to achieve a common understanding of the responsibilities and expectations of each party.
- New Section 1.7 was added with provisions on construction scheduling.
- New commentary to Section 1.10 was added to provide guidance on erector safety.
- Steel used as piling or other piling accessories was added to Section 2.2 as “Other steel, iron, or metal items”.
- Section 3.0 and commentary was revised to coordinate with ANSI/AISC 360-22.
- New Section 3.1 was added with provisions on structural design documents and specifications issued for construction. This section also contains updated requirements and guidance on painting responsibilities.
- New Section 3.2 was added with provisions for structural design documents and specifications issued as contract documents.
- In Section 4.5, requirements were added for the review of fabrication and erection documents, including additional commentary guidance.
- In Section 6.1, preferred material specifications were updated to parallel what will appear in the 16th Edition AISC *Steel Construction Manual*.
- In Section 6.4 the paint and steel cleaning provisions were expanded.
- In Section 10.4, the AESS fabrication requirements were updated.
- Table 10.1 was revised to align with Section 10.4 AESS requirement revisions.
- New commentary was added to Section 10.6 to provide guidance on weld access holes.
- New Section 11 was added to compile all fabrication and erection tolerances. This addition also included the removal of Section 6.4 and 7.13 from the 2016 Code.
- Section 11.2 includes new and expanded fabrication tolerances, included those applicable to camber. Additional guidance was added to the commentary.
- Section 11.3 includes new and expanded erection tolerances.
- All figures in Section 11 were updated to align with code language revisions and glossary terms.
- The document has been editorially revised for consistency with current terms and other related documents.

The Committee thanks Lawrence Griffis, Ron Johnson, Mark Holland, Larry Muir, Lawrence Kruth, and Tom Schlaflay for their contributions to the coordination of ANSI/AISC 303-22 with ANSI/AISC 360-22 regarding structural design documents and specifications. The Committee also thanks Larry Kloiber and Susan Burmeister, who authored AISC Design Guide 36, *Design Considerations for Camber*, which drove the language revision for camber tolerances in ANSI/AISC 303-22.

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GLOSSARY

The following terms are used in this Code. Where used, terms are italicized to alert the user that the term is defined in this Glossary.

Adjustable items. See Section 11.3.1.3.

AESS. See *Architecturally exposed structural steel*.

Allowance. A monetary amount included in a contract as a placeholder for work that is anticipated but not defined at the time the contract is executed.

Anchor bolt. See *Anchor rod*.

Anchor rod. A mechanical device that is either cast or drilled and chemically adhered, grouted, or wedged into concrete and/or masonry for the purpose of the subsequent attachment of *structural steel*.

Applicable building code. Building code under which the structure is designed.

Approval documents. The *structural steel shop drawings*, *erection drawings*, and *embedding drawings*, or where the parties have agreed in the *contract documents* to provide digital model(s), the *fabrication and erection models*. A combination of drawings and digital models also may be provided.

Architect. The entity that is professionally qualified and duly licensed to perform architectural services.

Architecturally exposed structural steel. See Section 10.

Bearing devices. Shop-attached base and bearing plates, loose base and bearing plates, and leveling devices, such as leveling plates, leveling nuts and washers, and leveling screws.

Building column line. The grid line of column centers set in the field based on the dimensions shown on the structural *design documents* and using the building layout provided by the owner's designated representative for construction. Column offsets are taken from the *building column line*. The *building column line* may be straight or curved as shown in the structural *design documents*.

Camber. Curvature in a beam or truss so as to compensate for deflection induced by loads.

Clarification. An interpretation, of the *design drawings* or *specifications* that have been released for construction, made in response to an *RFI* or a note on an approval drawing and providing an explanation that neither revises the information that has been released for construction nor alters the cost or schedule of performance of the work.

The Code, This Code. This document, the AISC *Code of Standard Practice for Steel Buildings and Bridges* as adopted by the American Institute of Steel Construction.

Connection. An assembly of one or more joints that is used to transmit forces between two or more members.



Documents

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Construction documents. Written, graphic, and pictorial documents prepared or assembled for describing the design (including the structural system), location, and physical characteristics of the elements of a building necessary to obtain a building permit and construct a building.

Contract documents. The documents that define the responsibilities of the parties that are involved in bidding, fabricating, and erecting *structural steel*. *Contract documents* include the *design documents*, the *specifications*, and the contract.

Design documents. *Design drawings*, *design model*, or a combination of drawings and models.

Design drawings. Graphic and pictorial portions of the *contract documents* showing the design, location, and dimensions of the work. These documents generally include, but are not necessarily limited to, *plans*, elevations, sections, details, schedules, diagrams, and notes.

Design model. Three-dimensional digital model of the structure that conveys the *structural steel* requirements given in Section 3.1.

Detailer. See *Steel detailer*.

Embedment drawings. Drawings that show the location and placement of items that are installed to receive *structural steel*.

Engineer, engineer of record. See *Structural engineer of record*.

Erection bracing drawings. Drawings that are prepared by the *erector* to illustrate the sequence of erection, any requirements for temporary supports and the requirements for raising, bolting, and/or welding. These drawings are in addition to the *erection drawings*.

Erection documents. *Erection drawings*, *erection model*, or a combination of drawings and models.

Erection drawings. Field-installation or member-placement drawings showing the location and attachment of the individual *structural steel* shipping pieces.

Erection model. Three-dimensional digital model produced to convey the information necessary to erect the *structural steel*. This may be the same digital model as the *fabrication model*, but it is not required to be.

Erector. The entity that is responsible for the erection of the *structural steel*.

Fabrication documents. *Shop drawings*, *fabrication model*, or a combination of drawings and models.

Fabrication model. Three-dimensional digital model produced to convey the information necessary to fabricate the *structural steel*.

Fabricator. The entity that is responsible for detailing (except in Section 4.5) and fabricating the *structural steel*.

Finish line, column finish line. The as-erected top of a column shipping piece at a *tier* splice or top of column, including all tolerances per Section 11.2.1.

Hazardous materials. Components, compounds, or devices that are either encountered during the performance of the contract work or incorporated into it containing substances that, notwithstanding the application of reasonable care, present a threat of harm to persons and/or the environment.

Inspector. The owner's testing and inspection agency's representative.

Issued for construction. The *engineer of record's* designation that the *design documents* are authorized to be used to construct the steel structure depicted in the *design documents*, and that these *design documents* incorporate the information that is to be provided per the requirements of Section A4 of the *AISC Specification for Structural Steel Buildings* (ANSI/AISC 360).

Issuing of design documents and specifications. The process by which the *owner's designated representative for design (ODRD)* delivers *design documents* and specifications for the purpose as designated and dated therein under contract to their client. See also *Releasing of design documents and specifications*.

Mill material. Steel mill products that are ordered expressly for the requirements of a specific project.

Other structures. Structures designed, fabricated, and erected in a manner similar to buildings, with building-like vertical and lateral load-resisting elements.

Owner. The entity that is identified as such in the *contract documents*.

Owner's designated representative for construction (ODRC). The *owner* or the entity that is responsible to the *owner* for the overall construction of the project, including its planning, quality, and completion. This is usually the general contractor, the construction manager, or similar authority at the jobsite.

Owner's designated representative for design (ODRD). The *owner* or the entity that is responsible to the *owner* for the overall structural design of the project, including the *structural steel frame*. This is usually the *structural engineer of record*.

Plans. See *Design drawings*.

Protected Zone. Areas of members or *connections* of members in which limitations apply to fabrication and attachments.

RCSC. Research Council on Structural Connections.

Released for construction. The term that describes the status of *contract documents* that are in such a condition that the *fabricator* and the *erector* can rely upon them for the performance of their work, including the ordering of material and the preparation of *shop* and *erection drawings* or *fabrication* and *erection models*.

Releasing of design documents and specifications. The process by which an *owner*, *ODRC*, or other party delivers *design documents* and *specifications* prepared by the *ODRD* for the purpose designated therein, to another party. See also *Issuing of design documents and specifications*.

Revision. An instruction or directive providing information that differs from information that has been *released for construction*. A *revision* may, but does not always, impact the cost or schedule of performance of the work.

RFI. A written request for information or *clarification* generated during the construction phase of the project.

SER. See *Structural engineer of record*.

Shop drawings. Drawings of the individual *structural steel* shipping pieces that are to be produced in the fabrication shop.

Specifications. The portion of the *contract documents* that consists of the written requirements for materials, standards, and workmanship.

Standard structural shapes. Hot-rolled W-, S-, M-, and HP-shapes, channels, and angles listed in ASTM A6/A6M; structural tees split from the hot-rolled W-, S-, and M- shapes listed in ASTM A6/A6M; hollow structural sections produced to ASTM A500/A500M, A501/A501M, A618/A618M, A847/A847M, A1065/A1065M, or A1085/A1085M; and steel pipe produced to ASTM A53/A53M.

Steel detailer. The entity that produces the *approval documents*.

Structural engineer of record (SER). The licensed professional who is responsible for sealing the *contract documents*, which indicates that he or she has performed or supervised the analysis, design, and document preparation for the structure and has knowledge of the load-carrying structural system.

Structural steel. The elements of the structural frame as given in Section 2.1.

Substantiating connection information. Information submitted by the *fabricator* in support of *connections* either selected by the *steel detailer* or designed by the licensed *engineer* working for the *fabricator*.

Tier. The *structural steel* framing defined by a column shipping piece.

Transfer force. A force local to the intersection of structural members that is required to be transferred across that intersection through a *connection* and its elements to assure the continuity of the load path in a structural frame.

Upper finished splice line. The top surface of a column shipping piece in a multi-tier building. The top of the shipping piece does not include detail material such as splice plates or erection aids.

Weld show-through. In *architecturally exposed structural steel*, visual indication of the presence of a weld or welds on the side of the member opposite the weld.

Working points. *Work points*, or *working points*, are points that occur at the intersection of working lines. Working lines are the centerlines of members in trusses, beams, columns, or vertical and horizontal bracing, except in an unsymmetrical cross section for which the working line is the neutral axis. This definition does not apply to member work points and working lines as defined in Section 11.2.2.2 or Section 11.3 of *this Code*.

ABBREVIATIONS

The following abbreviations are used in this Code. The abbreviations are written out where they first appear within a Section.

AASHTO (American Association of State Highway and Transportation Officials)

AESS (architecturally exposed structural steel)

AISC (American Institute of Steel Construction)

ANSI (American National Standards Institute)

AREMA (American Railway Engineering and Maintenance of Way Association)

ASD (allowable strength design)

ASME (American Society of Mechanical Engineers)

ASTM (American Society of Testing and Materials)

AWS (American Welding Society)

CAD (computer-aided design)

HSS (hollow structural section)

LRFD (load and resistance factor design)

ODRC (owner's designated representative for construction)

ODRD (owner's designated representative for design)

OSHA (Occupational Safety and Health Administration)

RCSC (Research Council on Structural Connections)

RFI (request for information)

SER (structural engineer of record)

SSPC (SSPC: The Society for Protective Coatings, which was formerly known as the Steel Structures Painting Council)



CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES

SECTION 1. GENERAL PROVISIONS

1.1. Scope

The *Code of Standard Practice for Steel Buildings and Bridges*, hereafter referred to as *the Code*, sets forth criteria for the trade practices involved in the design and construction of steel buildings, bridges, and *other structures*, and shall apply to all projects that involve fabricated *structural steel*. In the absence of specific instructions to the contrary in the *contract documents*, the trade practices that are defined in *this Code* shall govern the fabrication and erection of *structural steel*. Specific instructions to the contrary shall not violate any provisions of *applicable building codes*. The contract with the *fabricator* or *erector* shall identify by Code section number any specific instructions to the contrary not contained in the *design documents* or *specifications*. If specific instructions to the contrary have not been provided as required in this section, the provisions of *the Code* shall apply as written herein.

Commentary:

The practices defined in *this Code* are the commonly accepted standards of custom and usage for *structural steel* fabrication and erection, which generally represent the most efficient approach. Some provisions in *this Code* have been incorporated by reference into the International Building Code; see www.aisc.org/303IBC. These sections include, but are not limited to, (1) requirements for structural *design documents* and *specifications* issued for various purposes as defined in Section 3; (2) definition of structural steel as defined in Section 2.1; (3) consideration for initial system imperfections, including fabrication and erection tolerances, as set forth in Section 11; (4) surface preparation and painting requirements as set forth in Section 3; (5) *fabricator* and *erector* quality control requirements as set forth in Section 8; and (6) requirements for *fabricator* and *erector approval documents* as set forth in Section 4.

Reference is also made herein to AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360-22) Section A4, which contains requirements for *design documents* and *specifications issued for construction*. ANSI/AISC 360 is incorporated by reference into the International Building Code (IBC) and is therefore part of the building code.

The Code is a copyrighted document and has important legal consequences. Its language has been carefully written to apply to the construction of steel buildings, bridges, and *other structures*. Some projects may warrant specific modifications to Code provision(s) to suit project conditions. In such cases, any modifications to the specific language of *the Code* should be clearly set forth in the *contract documents*.



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The Code is a balanced, consensus document written in a “party-neutral” manner and should not be modified for the purpose of dictating a commercial advantage. To that end, Section 1.1 requires any specific instructions to the contrary unrelated to design elements (e.g., relating to commercial terms) to include a reference to the specific Code section number. This requirement is intended to ensure that all parties are aware of and specifically agree to specific instructions to the contrary that may work to the advantage of one party and to the disadvantage of another.

Extreme care should be taken to ensure that any modification is written in mandatory code language where applicable and is consistent with all other sections of *the Code* to result in a unified document. No modifications should be made to any Code section that violates the life safety or serviceability provisions of the *applicable building code* or results in a commercial advantage for any party that violates the intention of *the Code* to serve as a fair, balanced consensus document.

A meeting is recommended with the project stakeholders, including the *owner’s designated representative for construction (ODRC)*, the *owner’s designated representative for design (ODRD)*, the *fabricator/erec*tor and other parties, as appropriate, to discuss the scope of the project prior to the *design documents* and *specifications* being designated as *released for construction* as required by Section 3. This meeting can benefit the stakeholders in achieving a common understanding of the responsibilities and expectations of each party. Specifically, a discussion of any instructions to the contrary that modify any provisions of *the Code* that are applicable to the project and are included as part of the contract with the *fabricator/erec*tor should be clearly reviewed among the parties.

It is noted that *the Code* applies to all projects that involve fabricated *structural steel* regardless of what delivery method is selected by the *owner*. Refer to Section 3.2.

This Code is not intended to define a professional standard of care for the *owner’s designated representative for design*; change the duties and responsibilities of the *owner*, contractor, *architect*, or *structural engineer of record* from those set forth in the *contract documents*; nor assign to the *owner*, *architect*, or *structural engineer of record* any duty or authority to undertake responsibility inconsistent with the provisions of the *contract documents*.

This Code is not applicable to steel joists or metal building systems, which are addressed by SJI and MBMA, respectively.

1.2. Dates of Referenced Specifications, Codes, and Standards

The following dated versions of documents are referenced in *this Code*:

AASHTO Specification—2020 AASHTO *LRFD Bridge Design Specifications*, 9th Edition

ANSI/AISC 341—ANSI/AISC 341-22, *AISC Seismic Provisions for Structural Steel Buildings*

- ANSI/AISC 360—ANSI/AISC 360-22, *AISC Specification for Structural Steel Buildings*
- ASME B46.1—ASME B46.1-19, *Surface Texture (Surface Roughness, Waviness, and Lay)*
- AREMA Manual—2021 *AREMA Manual for Railway Engineering, Volume II—Structures, Chapter 15*
- ASTM A6/A6M-19, *Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling*
- ASTM A53/A53M-20, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*
- ASTM A500/A500M-21, *Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes*
- ASTM A501/A501M-21, *Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing*
- ASTM A572/A572M-21e1, *Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel*
- ASTM A618/A618M-21, *Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing*
- ASTM A847/A847M-20, *Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance*
- ASTM A992/A992M-20, *Standard Specification for Structural Steel Shapes*
- ASTM A1065/A1065M-18, *Standard Specification for Cold-Formed Electric-Fusion (Arc) Welded High-Strength Low-Alloy Structural Tubing in Shapes, with 50 ksi [345 MPa] Minimum Yield Point*
- ASTM A1085/A1085M-15, *Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)*
- AWS D1.1/D1.1M—AWS D1.1/D1.1M:2020, *Structural Welding Code—Steel*
- AWS D1.5M/D1.5—AWS D1.5M/D1.5:2020, *Bridge Welding Code*
- AWS D1.8/D1.8M—AWS D1.8/D1.8M:2021, *Structural Welding Code—Seismic Supplement*
- RCSC Specification—*Specification for Structural Joints Using High-Strength Bolts*, 2020
- SSPC SP2—SSPC *Surface Preparation Specification No. 2, Hand Tool Cleaning*, 2018

Commentary:

Additionally, the following dated versions of documents are referenced in the Commentary on *this Code*:

- AIA Document E202—2008 Building Information Modeling Protocol Exhibit
- AIA Document E203—2013 Building Information Modeling and Digital Data Exhibit
- AIA Document G201—2013 Project Digital Data Protocol Form
- AIA Document G202—2013 Project Building Information Modeling Protocol Form
- ASTM A563-15, *Standard Specification for Carbon and Alloy Steel Nuts*



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ASTM A563M-07(2013), *Standard Specification for Carbon and Alloy Steel Nuts (Metric)*
ASTM F3125/F3125M-15, *Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions*
BIMFORUM 2013, *Level of Development Specification*
CASE Document 962—*National Practice Guidelines for the Structural Engineer of Record*, 2012
Consensus Docs 301—2013 BIM Addendum
OSHA *Safety and Health Regulations for Construction*—29 CFR 1926 Subpart R—Steel Erection
SSPC SP6—*SSPC Surface Preparation Specification No. 6, Commercial Blast Cleaning*, 2015

1.3. Units

In *this Code*, the values stated in either U.S. customary units or SI units shall be used. Each system shall be used independently of the other.

Commentary:

In *this Code*, dimensions, weights, and other measures are given in U.S. customary units with rounded or rationalized SI-unit equivalents in brackets. Because the values stated in each system are not exact equivalents, the selective combination of values from each of the two systems is not permitted.

1.4 Responsibility for Identifying Contract Documents

The *owner's designated representative for construction (ODRC)* shall identify all *contract documents*. When the *design drawings* and a *design model* are both provided, the *owner's designated representative for design (ODRD)* shall specify which document is the controlling *contract document*. The *contract documents* shall establish the procedures for communicating changes to the *contract documents*, permitted use of design and other digital models, and restrictions on the release of these digital models to other parties.

Commentary:

There can be many combinations of drawings and digital models used as part of the *contract documents*, and to transfer information between the many entities in the design and construction processes. The communication of design information to the *fabricator* through the *design model* is permitted in *this Code*. *This Code* does not designate which of these possible documents takes precedence because of the variation in current practice. The document hierarchy is left to the *ODRD* and communicated through the *ODRC*. The *ODRC* must provide guidance as to which information is to be considered to have precedence if conflicts exist.

1.5. Design Criteria

For buildings and *other structures*, in the absence of other design criteria, the provisions in ANSI/AISC 360 shall govern the design of the *structural steel*. For bridges, in the absence of other design criteria, the provisions in the AASHTO Specification and AREMA Specification shall govern the design of the *structural steel*, as applicable.

1.6. Responsibility for Design

- 1.6.1. When the *ODRD* provides the design, *design documents*, and *specifications*, the *fabricator* and the *erector* are not responsible for the suitability, adequacy, or building-code conformance of the design.
- 1.6.2. When the *owner* enters into a direct contract with the *fabricator* to both design and fabricate an entire, completed steel structure, the *fabricator* shall be responsible for the suitability, adequacy, conformance with *owner*-established performance criteria, and building-code conformance of the *structural steel* design. The *owner* shall be responsible for the suitability, adequacy, and building-code conformance of the non-*structural steel* elements and shall establish the performance criteria for the *structural steel* frame.

1.7. Construction Schedule

The *ODRC* shall provide a construction schedule in the bid documents. The period of performance by the steel *fabricator* and *erector* shall be mutually agreed upon with the *ODRC* prior to contract award.

1.8. Patents and Copyrights

The entity or entities that are responsible for the specification and/or selection of proprietary structural designs shall secure all intellectual property rights necessary for the use of those designs.

1.9. Existing Structures

- 1.9.1. Demolition and shoring of any part of an existing structure are not within the scope of work that is provided by either the *fabricator* or the *erector*. Such demolition and shoring shall be performed in a timely manner so as not to interfere with or delay the work of the *fabricator* or the *erector*.
- 1.9.2. Protection of an existing structure and its contents and equipment, so as to prevent damage from normal erection processes, is not within the scope of work that is provided by either the *fabricator* or the *erector*. Such protection shall be performed in a timely manner so as not to interfere with or delay the work of the *fabricator* or the *erector*.



- 1.9.3. Surveying or field dimensioning of an existing structure is not within the scope of work that is provided by either the *fabricator* or the *erector*. Such surveying or field dimensioning, which is necessary for the completion of the *approval documents* and fabrication, shall be performed and furnished to the *fabricator* in a timely manner so as not to interfere with or delay the work of the *fabricator* or the *erector*.
- 1.9.4. Abatement or removal of *hazardous materials* is not within the scope of work that is provided by either the *fabricator* or the *erector*. Such abatement or removal shall be performed in a timely manner so as not to interfere with or delay the work of the *fabricator* or the *erector*.

1.10. Means, Methods, and Safety of Erection

- 1.10.1. The *erector* shall be responsible for the means, methods, and safety of erection of the *structural steel* frame.
- 1.10.2. The *structural engineer of record (SER)* shall be responsible for the structural adequacy of the design of the structure in the completed project. The *SER* shall not be responsible for the means, methods, and safety of erection of the *structural steel* frame. See also Section 7.10.

Commentary:

The *erector* normally establishes the methods and sequence of the work for the erection process, including the safety of the personnel involved in these activities. Special requirements should be included in the bid documents when another party prescribes erection means and methods. The *erector* is also in control of the stability of the structure during this activity. A site-specific or project-specific erection plan and *erection bracing drawings* can provide the work plan and control mechanisms to maintain safety for personnel and structural stability during erection. The *ODRC*, per OSHA 29 CFR 1926 Subpart R—Steel Erection, provides information and support to the *erector* to assure safety and structural stability. The *ODRD* provides the required information related to structural stability as required by Section 7.10.1.

1.11. Tolerances

Tolerances for materials, fabrication, and erection shall be as stipulated in Sections 5, 10, and 11. Tolerances absent from *this Code* or the *contract documents* shall not be considered zero by default.

Commentary:

Tolerances are not necessarily specified in *this Code* for every possible variation that could be encountered. For most projects, where a tolerance is not specified or covered in *this Code*, it is not needed to ensure that the fabricated and erected *structural steel* complies with the requirements in Section 11. If a special design concept or system component requires a tolerance that is not specified in *this Code*, the necessary tolerance should be specified in the *contract documents*. If a tolerance is not shown and is deemed by the *fabricator* and/or *erector* to be

important to the successful fabrication and erection of the *structural steel*, it should be requested from the *owner's designated representative for design*. The absence of a tolerance in *this Code* for a particular condition does not mean that the tolerance is zero; rather, it means that no tolerance has been established. In any case, the default tolerance is not zero.

1.12. Marking of Protected Zones in Seismic Force-Resisting Systems

The *fabricator* shall permanently mark *protected zones* that are designated on the structural *design documents* in accordance with ANSI/AISC 341, Section A4.1. If these markings are obscured in the field, such as after the application of fire protection, the *ODRC* shall re-mark the *protected zones* as they are designated on the structural *design documents*.

SECTION 2. CLASSIFICATION OF MATERIALS

2.1. Definition of Structural Steel

Structural steel shall consist of the elements of the structural frame that are shown and sized in the *structural design documents*, essential to support the design loads and described as follows:

Anchor rods that will receive *structural steel*
 Base plates, if part of the *structural steel* frame
 Beams, including built-up beams, if made from *standard structural shapes* and/or plates
 Bearing plates, if part of the *structural steel* frame
 Bearings of steel for girders, trusses, or bridges
 Bracing, if permanent
 Canopy framing, if made from *standard structural shapes* and/or plates
 Columns, including built-up columns, if made from *standard structural shapes* and/or plates
Connection materials for framing *structural steel* to *structural steel*
 Crane stops, if made from *standard structural shapes* and/or plates
 Door frames, if made from *standard structural shapes* and/or plates and if part of the *structural steel* frame
 Edge angles and plates, if attached to the *structural steel* frame or steel (open-web) joists
 Embedded *structural steel* parts, other than bearing plates, that will receive *structural steel*
 Expansion joints, if attached to the *structural steel* frame
 Fasteners for connecting *structural steel* items: permanent shop bolts, nuts, and washers; shop bolts, nuts, and washers for shipment; field bolts, nuts, and washers for permanent *connections*; and permanent pins
 Floor-opening frames, if made from *standard structural shapes* and/or plates and attached to the *structural steel* frame or steel (open-web) joists
 Floor plates (checkered or plain), if attached to the *structural steel* frame
 Girders, including built-up girders, if made from *standard structural shapes* and/or plates
 Girts, if made from *standard structural shapes*
 Grillage beams and girders
 Hangers, if made from *standard structural shapes*, plates, and/or rods and framing *structural steel* to *structural steel*
 Leveling nuts and washers
 Leveling plates
 Leveling screws
 Lintels, if attached to the *structural steel* frame
 Machinery supports, if made from *standard structural shapes* and/or plates and attached to the *structural steel* frame
 Marquee framing, if made from *standard structural shapes* and/or plates
 Monorail elements, if made from *standard structural shapes* and/or plates and attached to the *structural steel* frame



Posts, if part of the *structural steel* frame
 Purlins, if made from *standard structural shapes*
 Relieving angles, if attached to the *structural steel* frame
 Roof-opening frames, if made from *standard structural shapes* and/or plates and attached to the *structural steel* frame or steel (open-web) joists
 Roof-screen support frames, if made from *standard structural shapes*
 Sag rods, if part of the *structural steel* frame and connecting *structural steel* to *structural steel*
 Shear stud connectors, if specified to be shop attached
 Shims, if permanent
 Steel plate shear walls and/or composite steel plate shear wall systems, and steel plate structures, if made from standard shapes and/or plates, and if part of the *structural steel* frame
 Struts, if permanent and part of the *structural steel* frame
 Tie rods, if part of the *structural steel* frame
 Trusses, if made from *standard structural shapes* and/or built-up members
 Wall-opening frames, if made from *standard structural shapes* and/or plates and attached to the *structural steel* frame
 Wedges, if permanent

Commentary:

The *fabricator* normally fabricates the items listed in Section 2.1. Such items should be shown, sized, and described in the *structural design documents*. Bracing includes vertical bracing for resistance to wind and seismic load and structural stability, horizontal bracing for floor and roof systems, and permanent stability bracing for components of the *structural steel* frame.

2.2. Other Steel, Iron, or Metal Items

Structural steel shall not include other steel, iron, or metal items that are not generally described in Section 2.1, even where such items are shown in the *structural design documents* or are attached to the *structural steel* frame. Other steel, iron, or metal items include, but are not limited to, the following:

Base plates, if not part of the *structural steel* frame
 Bearing plates, if not part of the *structural steel* frame
 Bearings, if nonsteel
 Cables for permanent bracing or suspension systems
 Castings
 Catwalks
 Chutes
 Cold-formed steel products
 Cold-rolled steel products, except those that are specifically covered in ANSI/AISC 360
 Corner guards
 Crane rails, splices, bolts, and clamps
 Crane stops, if not made from *standard structural shapes* or plates



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Door guards
Embedded steel parts, other than bearing plates, that do not receive *structural steel* or that are embedded in precast concrete
Expansion joints, if not attached to the *structural steel* frame
Flagpole support steel
Floor plates (checkered or plain), if not attached to the *structural steel* frame
Forgings
Gage-metal products
Grating
Handrail
Hangers, if not made from *standard structural shapes*, plates, and/or rods, or not framing *structural steel* to *structural steel*
Hoppers
Items that are required for the assembly or erection of materials that are furnished by trades other than the *fabricator* or *erector*
Ladders
Lintels, if not attached to the *structural steel* frame
Masonry anchors
Ornamental metal framing
Other miscellaneous metal not already listed
Pressure vessels
Reinforcing steel for concrete or masonry
Relieving angles, if not attached to the *structural steel* frame
Roof screen support frames, if not made from *standard structural shapes*
Safety cages
Shear stud connectors, if specified to be field installed
Stacks
Stairs
Steel deck
Steel (open-web) joists
Steel joist girders
Steel used as piling or piling accessories
Tanks
Toe plates
Trench or pit covers

Commentary:

Section 2.2 includes many items that may be furnished by the *fabricator* if contracted to do so by specific notation and detail in the *contract documents*. When such items are contracted to be provided by the *fabricator*, coordination will normally be required between the *fabricator* and other material suppliers and trades. The provisions in *this Code* are not intended to apply to items in Section 2.2.

In previous editions of *this Code*, provisions regarding who should normally furnish field-installed shear stud connectors and cold-formed steel deck support angles were included in Section 7.8. These provisions have been eliminated since field-installed shear stud connectors and steel deck support angles are not defined as *structural steel* in *this Code*.

Stainless steel is not covered in *this Code*. AISC 370, AISC 313, and Design Guide 27, *Structural Stainless Steel*, are sources of useful information regarding the practical fabrication and installation issues associated with structural stainless steel components.



SECTION 3. DESIGN DOCUMENTS AND SPECIFICATIONS

The *issuing of design documents and specifications* shall be by the owner's designated representative for design (ODRD). The *releasing of design documents and specifications* shall be by an owner, owner's designated representative for construction (ODRC), or other party. *Design documents and specifications* shall be released in accordance with Section A4.2 of ANSI/AISC 360.

Commentary:

Refer to the ANSI/AISC 360, Commentary Section A4.2, for guidelines related to the issuance and release of *design documents and specifications* on a project.

3.1. Structural Design Documents and Specifications Issued for Construction

Structural *design documents and specifications issued for construction* for all or a portion of the work shall be based upon a completed design for the scope of work represented and provide the following information, as applicable, to define the work to be fabricated and erected:

- (a) Information as required by the *applicable building code*.
- (b) Information as required in ANSI/AISC 360 Section A4 and ANSI/AISC 341 Section A4.
- (c) Shop painting and surface preparation requirements. Specific members or portions thereof that are to be left unpainted shall be identified. When shop painting is required, the paint system requirements shall be specified, including (1) the identification of specific members or portions thereof to be painted; (2) the surface preparation that is required for these members; (3) the paint *specifications* and manufacturer's product identification, including color requirements, if any, that are required for these members; (4) the minimum dry-film shop-coat thickness that is required for these members; (5) identification of compatible shop applied and field applied paint systems in multi-coat application; and (6) the party or subcontractor responsible for field touch-up including repair of shipping and handling damage after shop application(s). The absence of the foregoing information for bidding purposes shall result in provisions for related work to be absent from the bid. When the actual information becomes available subsequent to bidding, the contract price and schedule shall be adjusted equitably in accordance with Sections 9.4 and 9.5.
- (d) Designation of members to which the requirements of Section 10 for AESS apply.
- (e) Where leveling plates are to be furnished, their locations and required thickness and sizes.

The structural *design documents, specifications*, and addenda shall be numbered and dated for the purposes of identification. Three-dimensional digital models shall contain a unique identifier.

Commentary:

In the interests of public safety, structural *design documents* and *specifications issued for construction* for all or a portion of the work must be based upon a completed design for the scope of work represented. The items listed should include contractual requirements addressed in the *Code*.

The *engineer of record* should also consider all or a portion of the specified information to be shown on structural *design documents* and *specifications* used for ordering *structural steel* or placing mill orders. Changes made after ordering *structural steel* or placing mill orders will likely lead to change orders if not properly coordinated and addressed in a timely manner prior to construction. *Revisions* to the *design documents* and *specifications* are covered under Section 3.6.

In some cases, the *owner* can benefit when reasonable latitude is allowed in the *contract documents* for alternatives that can reduce costs without compromising quality. However, critical requirements that are necessary to protect the *owner's* interests that affect the integrity of the structure or that are necessary for the *fabricator* or *erector* to proceed with their work must be included in the *contract documents issued for construction*. A list of important information and requirements are provided to supplement items required for documents *issued for construction* in ANSI/AISC 360. This list should be modified or supplemented, if necessary, to suit actual project conditions.

Some members or portions thereof may be required to be left unpainted, such as those that will be in contact and acting compositely with concrete, those areas near or within *connections*, or those that will receive spray-applied fire protection materials. The *contract documents* should clearly indicate where the change in finishes start and stop so there is no confusion between all parties.

This section refers directly to “painting”. The *contract documents* should clearly state its applicability to other coatings, such as intumescent paint, i.e., fireproofing.

This section applies to shop painting. If project requirements are to include field painting, these requirements must be explicitly identified in the *contract documents*; see Section 7.17. SSPC *Painting Manual*, Volumes 1 and 2, 5th Edition is a useful reference for coatings and painting.

The surface preparation used for a paint system must carefully consider the intended use of the steel (i.e., interior, exterior, *AESS*, etc.) as it affects both the aesthetics of surface irregularities and durability against paint failure. For most interior commercial applications, durability is not normally a concern as discussed in the ANSI/AISC 360, Commentary Section M3. However, if surface irregularities from mill scale, whether coated or not, or accumulated rust would be visually objectionable, then an SP6 preparation should be considered because a less aggressive preparation will not remove all tightly adhered mill scale and may not remove all rust from material stored outside. A mockup can be useful to demonstrate the impact of an SP6 preparation on surface irregularities.

For interior corrosive environments and exterior applications, an SP6 preparation is generally regarded as the minimum level of preparation necessary to provide adequate durability against paint failure. However, for other types of coatings (e.g., hot dip galvanizing), that may not be the case.



3.2. Structural Design Documents and Specifications Issued as Contract Documents

3.2.1. Traditional Design-Bid-Build Delivery Method

Structural *design documents* and *specifications* issued as the basis for *contract documents* shall provide the information as specified in Section 3.1 for structural *design documents* and *specifications issued for construction*.

3.2.2. Alternate Delivery Methods

When an alternative delivery method is implemented and structural *design documents* and *specifications* not meeting all the listed requirements of Section 3.2.1 are issued as *contract documents*, the listed information not specified shall be acknowledged in the contract with the *fabricator* and the *erector*. The *contract documents* shall convey the character, quantity, and complexity of the *structural steel* to be fabricated and erected so that the *fabricator* and *erector* can provide bids that are accurate and complete. The information furnished shall include the following items as minimum requirements:

- (a) The section, size, material grade, and location of members.
- (b) Geometry and work points necessary for layout.
- (c) Column base, floor, and roof elevations.
- (d) Column centers and offsets.
- (e) When the requirements of ANSI/AISC 341 are applicable, the information required in ANSI/AISC 341, Section A4.
- (f) The lateral force-resisting system and connecting diaphragm elements that provide for lateral strength and stability in the completed structure.
- (g) Requirements for all *connections* and member reinforcement as required by Sections 3.2.3 and 3.2.4. For *connections* that are delegated by Option 3, the *engineer of record* shall provide project-specific schematic *connection* details for all *connection* types based on realistic design forces to define the design intent and sufficient information for the delegated *connection* designer (the licensed *engineer* to whom the work is delegated) to understand the scope and nature of the delegated work and its relationship to the overall design. The information that is required to perform the delegated design shall be commensurate with the character and complexity of the project.

Where any of the information required for a complete design as defined in Section 3.1 for *design documents* and *specifications issued for construction* is not specified, including member reinforcement and *connections* that are delegated with Section 3.2.3, Option 3, *allowances* shall be specified in the contract and the provisions of Section 9.1.5 shall apply.

When the actual quantity and/or details of any of the required items differ from the specified *allowances*, including *connections* and all member reinforcement where delegated with Section 3.2.3, Option 3, the final contract price and schedule shall be adjusted equitably in accordance with Section 9.1.5.

When an alternative project delivery method is selected, release of the structural *design documents* and *specifications* shall constitute a release for the purpose stated on the *design documents* and *specifications* that were issued by the *CORD*, as specified